What is Claimed is:

1. A process which comprises mixing together at least one of each of the following: (a) a 4,5-benzoindanone, (b) an alkali or alkaline earth metal borohydride or alkali or alkaline earth metal aluminum hydride, and (c) a hydroxyl-containing compound capable of interacting with (b) to serve as a hydrogen source, under reaction conditions causing a 4,5-benzoindanol to be formed.

2. A process according to Claim 1 wherein the mixture further includes at least one ether.

3. A process according to Claim 2 wherein the ether comprises at least one cyclic ether.

~~4.~~ A process according to ~~Claim 2 wherein the ether is tetrahydrofuran~~.

5. A process according to Claim 1 wherein the 4,5-benzoindanone is a 2-hydrocarbyl-4,5-benzoindanone.

6. A process according to Claim 4 wherein the 2-hydrocarbyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one.

7. A process according to Claim 1 wherein (b) is at least one compound of the formula $AMH_x(OR)_y$ wherein A is an alkali metal, M is boron or aluminum, R is hydrocarbyl, x is an integer in the range of 2 to 4, and y is an integer in the range of 0 to 2, the sum of x and y being 4.

7 ~~8.~~ A process according to Claim 1 wherein (b) is sodium borohydride and (c) is water or an alcohol.

8 ~~9.~~ A process according to Claim 1 wherein (b) is an alkali metal aluminum tetrahydride and (c) is water or an alcohol.

Sub A3 ~~10.~~ A process according to Claim 1 wherein the mixture further includes at least one ether, wherein the 4,5-benzoindanone is ~~a~~ 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride and wherein (c) is water or an alcohol.

10 ~~11.~~ A process according to Claim 9 ~~10~~ wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

Sub A4 12. A process which comprises (i) mixing together at least one of each of the following: (a) a 4,5-benzoindanone, (b) an alkali or alkaline earth metal borohydride or alkali or alkaline earth metal aluminum hydride, and (c) a hydroxyl-containing compound capable of interacting with (b) to serve as a hydrogen source, under reaction conditions causing a 4,5-benzoindanol to be formed; and (ii) catalytically dehydrating said 4,5-benzoindanol using a arylsulfonic acid catalyst to thereby form a 4,5-benzoindene.

13. A process according to Claim 12 wherein the mixture formed in (i) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride and wherein (c) is water or an alcohol.

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14. A process according to Claim 12 wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

15. A process according to Claim 12 wherein the mixture formed in (i) further includes at least one ether, wherein the reaction in (i) is terminated by quenching the reaction mixture with water or an aqueous mixture, and wherein 4,5-benzoindanol formed in (i) is separated from ether and water prior to conducting the catalytic dehydration of (ii).

16. A process according to Claim 15 wherein the separation of 4,5-benzoindanol from the ether and water is effected by extracting the quenched reaction mixture with a liquid aromatic hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and distilling at least the ether from the resultant extract.

17. A process according to Claim 12 wherein the mixture formed in (i) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride, wherein (c) is water or an alcohol, wherein the reaction in (i) is terminated by quenching the reaction mixture with water or an aqueous mixture, wherein a separation between the water and organic constituents of the reaction mixture is effected by extracting the quenched reaction mixture with a liquid hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and, if present, the alcohol, wherein said ether and, if present, said alcohol are distilled off to leave a liquid hydrocarbon solution of the 4,5-benzoindanol formed in (i), and wherein the catalytic dehydration of (ii) is conducted without isolating the 4,5-benzoindanol from the liquid hydrocarbon solution.

15 ~~18~~. A process according to Claim 14 ~~17~~ wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

16 ~~19~~. A process according to Claim 15 ~~18~~ wherein (c) is an alcohol and wherein the liquid hydrocarbon is at least one aromatic hydrocarbon capable of forming an azeotrope with water.

17 ~~20~~. A process according to Claim 16 ~~19~~ wherein the alcohol is methanol and wherein the liquid hydrocarbon consists essentially of toluene.

Sub A6

21. A process which comprises:

1) mixing together at least one of each of the following: (a) a 4,5-benzoindanone, (b) an alkali or alkaline earth metal borohydride or alkali or alkaline earth metal aluminum hydride, and (c) a hydroxyl-containing compound capable of interacting with (b) to serve as a hydrogen source, under reaction conditions causing a 4,5-benzoindanol to be formed;

2) catalytically dehydrating said 4,5-benzoindanol using a arylsulfonic acid catalyst to thereby form a 4,5-benzoindene; and

3) deprotonating said 4,5-benzoindene with a strong base and reacting the resultant deprotonated intermediate with a reactant which in its original condition can be depicted by the formula $R^{11}R^{12}M^1X_2$ where R^{11} and R^{12} are the same or different and each is (i) a hydrocarbyl group containing up to about 18 carbon atoms or (ii) a hydrocarbyl-(oxyalkylene) or hydrocarbylpoly(oxyalkylene) group containing up to about 100 carbon atoms; M^1 is a silicon, germanium or tin atom; and X is a halogen atom; such that a silicon-, germanium- or tin-bridged complex of the 4,5-benzoindene is formed.

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19 ~~22~~. A process according to Claim ~~21~~ 18 wherein R^{11} and R^{12} are the same and are C_1 to C_4 alkyl groups, wherein M^1 is a silicon atom, and wherein X is a bromine or chlorine atom.

Sub A7 ~~23~~. A process according to Claim 22 wherein the mixture formed in 1) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride and wherein (c) is water or an alcohol.

21 ~~24~~. A process according to Claim ~~23~~ 20 wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

25. A process according to Claim 22 wherein the mixture formed in 1) further includes at least one ether, wherein the reaction in 1) is terminated by quenching the reaction mixture with water or an aqueous mixture, and wherein 4,5-benzoindanol formed in 1) is separated from ether and water prior to conducting the catalytic dehydration of 2).

26. A process according to Claim 25 wherein the separation of 4,5-benzoindanol from the ether and water is effected by extracting the quenched reaction mixture with a liquid aromatic hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and distilling at least the ether from the resultant extract.

Sub A8 27. A process according to Claim 22 wherein the mixture formed in 1) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride, wherein (c) is water or an alcohol, wherein the reaction in 1) is terminated by quenching the reaction mixture with water or an aqueous mixture, wherein a separation between the water and organic constituents of the reaction

mixture is effected by extracting the quenched reaction mixture with a liquid hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and, if present, the alcohol, wherein said ether and, if present, said alcohol are distilled off to leave a liquid hydrocarbon solution of the 4,5-benzoindanol formed in 1), and wherein the catalytic dehydration of 2) is conducted without isolating the 4,5-benzoindanol from the liquid hydrocarbon solution.

23 ~~28~~. A process according to Claim 22 ~~27~~ wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

24 ~~29~~. A process according to Claim 23 ~~28~~ wherein (c) is an alcohol and wherein the liquid hydrocarbon is predominately one or more one aromatic hydrocarbons capable of forming an azeotrope with water.

25 ~~30~~. A process according to Claim 18 ~~21~~ wherein the strong base is a lithium alkyl.

31. A process which comprises:

1) mixing together at least one of each of the following: (a) a 4,5-benzoindanone, (b) an alkali or alkaline earth metal borohydride or alkali or alkaline earth metal aluminum hydride, and (c) a hydroxyl-containing compound capable of interacting with (b) to serve as a hydrogen source, under reaction conditions causing a 4,5-benzoindanol to be formed;

2) catalytically dehydrating said 4,5-benzoindanol using a arylsulfonic acid catalyst to thereby form a 4,5-benzoindene;

3) deprotonating said 4,5-benzoindene with a strong base and reacting the resultant deprotonated intermediate with a reactant which in its original condition can be depicted

by the formula $R^{11}R^{12}M^1X_2$ where R^{11} and R^{12} are the same or different and each is (i) a hydrocarbyl group containing up to about 18 carbon atoms or (ii) a hydrocarbyl-(oxyalkylene) or hydrocarbylpoly(oxyalkylene) group containing up to about 100 carbon atoms; M^1 is a silicon, germanium or tin atom; and X is a halogen atom; such that a silicon-, germanium- or tin-bridged complex of the 4,5-benzoindene is formed; and

4) deprotonating said bridged complex with a strong base and reacting the resultant deprotonated intermediate with a Group IV, V, or VI metal tetrahalide to thereby form a silicon-, germanium- or tin-bridged Group IV, V, or VI metal-containing metallocene complex.

27 ~~32~~. A process according to Claim 26 ~~31~~ wherein R^{11} and R^{12} are the same and are C_1 to C_4 alkyl groups, wherein M^1 is a silicon atom, wherein X is a bromine or chlorine atom, and wherein the Group IV, V, or VI metal-containing reactant is a zirconium tetrahalide.

33. A process according to Claim 32 wherein the mixture formed in 1) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride, wherein (c) is water or an alcohol, and wherein the zirconium tetrahalide is zirconium tetrachloride or zirconium tetrabromide.

29 ~~34~~. A process according to Claim 28 ~~33~~ wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

~~35~~. A process according to Claim 32 wherein the mixture formed in 1) further includes at least one ether, wherein the reaction in 1) is terminated by quenching the reaction

mixture with water or an aqueous mixture, and wherein 4,5-benzoindanol formed in 1) is separated from ether and water prior to conducting the catalytic dehydration of 2).

36. A process according to Claim 35 wherein the separation of 4,5-benzoindanol from the ether and water is effected by extracting the quenched reaction mixture with a liquid aromatic hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and distilling at least the ether from the resultant extract.

37. A process according to Claim 32 wherein the mixture formed in 1) further includes at least one ether, wherein the 4,5-benzoindanone is a 2-alkyl-4,5-benzoindanone, wherein (b) is an alkali metal borohydride, wherein (c) is water or an alcohol, wherein the reaction in 1) is terminated by quenching the reaction mixture with water or an aqueous mixture, wherein a separation between the water and organic constituents of the reaction mixture is effected by extracting the quenched reaction mixture with a liquid hydrocarbon having a higher boiling point or a higher initial boiling point than the ether, and, if present, the alcohol, wherein said ether and, if present, said alcohol are distilled off to leave a liquid hydrocarbon solution of the 4,5-benzoindanol formed in 1), and wherein the catalytic dehydration of 2) is conducted without isolating the 4,5-benzoindanol from the liquid hydrocarbon solution.

38. A process according to Claim 37 wherein the ether is at least predominately tetrahydrofuran, wherein the 2-alkyl-4,5-benzoindanone is a mixture of a major amount of 2-methyl-4,5-benzoindan-1-one and a minor amount of 2-methyl-4,5-benzoindan-3-one, and wherein (b) is sodium borohydride.

39. A process according to Claim 38 wherein (c) is an alcohol and wherein the liquid hydrocarbon consists essentially of at least one aromatic hydrocarbon capable of forming an azeotrope with water.

40. A process according to Claim 31 wherein the strong base used in 3) and in 4) is a lithium alkyl.

41. A process which comprises deprotonating a 4,5-benzoindene with a strong base and reacting the resultant deprotonated intermediate while dissolved in a liquid lower dialkyl ether with a reactant which in its original condition can be depicted by the formula $R^{11}R^{12}M^1X_2$ where R^{11} and R^{12} are the same or different and each is (i) a hydrocarbyl group containing up to about 18 carbon atoms or (ii) a hydrocarbyl(oxyalkylene) or hydrocarbylpoly(oxyalkylene) group containing up to about 100 carbon atoms; M^1 is a silicon, germanium or tin atom; and X is a halogen atom; such that a slurry of a silicon-, germanium- or tin-bridged complex of the 4,5-benzoindene is formed, and separating the solids from the liquid phase by filtration, centrifugation or decantation.

42. A process according to Claim 41 wherein the 4,5-benzoindene is a 2-alkyl-4,5-benzoindene, wherein the strong base is a lithium alkyl and wherein said reactant is a dialkyldihalosilane.

43. A process according to Claim 41 wherein the 4,5-benzoindene is a 2-alkyl-4,5-benzoindene, and wherein said reactant is a dialkyldihalosilane in which the alkyl groups contain no more than 4 carbon atoms each.

44. A process according to Claim 41 wherein the 4,5-benzoindene is a 2-alkyl-4,5-benzoindene, wherein the strong base is a lithium alkyl, wherein said reactant is a dialkyldihalosilane, and wherein said solids are separated from the liquid phase by filtration.

45. A process according to Claim 41 wherein the 4,5-benzoindene is 2-methyl-4,5-benzoindene, wherein the strong base is butyllithium, wherein said ether is diethyl ether, wherein said reactant is dichlorodimethylsilane, and wherein said solids are separated from the liquid phase by filtration.

46. A process according to Claim 31 which further comprises heating a slurry of said solids at an elevated temperature in an aprotic, polar solvent so as to extract impurities from said solids to said solvent and then separating the impurity-containing solvent and the solids from each other.

40 ~~47~~. A process according to Claim ~~46~~ 39 wherein said aprotic, polar solvent is an ether.

41 ~~48~~. A process in accordance to Claim ~~47~~ 40 wherein said ether is tetrahydrofuran.